

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CURRENTLY AMENDED) An apparatus for routing packets from a first network node to a second network node in a data network, comprising:

means for ~~assigning provisioning~~ and then sending one or more [[a]] unique first node identifiers (IDs) to the first node, wherein at least one of the one or more unique first node IDs is assigned and sent in response to a request from the first node for an identity assignment, wherein each of the one or more unique first node IDs uniquely identifies the first node is assigned by one or more entities other than the first node, and wherein each of the one or more unique first node IDs is associated with a first virtual private network (VPN), ~~wherein provisioning the unique first node ID also comprises determining a virtual private network (VPN) that is associated with the first node, selecting the unique first node ID from a set of unique ID's that are associated with the VPN of the first node, and mapping a unique second node ID with the VPN of the first node, wherein the provisioning, sending, and mapping are accomplished by one or more entities other than the first node;~~

means for receiving a packet from the first node, said packet including at least one ~~the~~ unique first ~~second~~ node ID[[,]] and ~~including~~ routing information for routing said packet to a destination address associated with said second node; and

means for routing the received packet to the destination address based on the received ~~using said unique second node ID, routing information and the received at least one unique first node ID and the destination address being associated with the first VPN, and the mapping to determine whether said first node is associated with at least one VPN.~~

2-11. (CANCELLED)

12. (NEW) A method of routing packets from a first network node to a second network node in a data network, comprising:

assigning and then sending one or more unique first node identifiers (IDs) to the first node, wherein at least one of the one or more unique first node IDs is assigned and sent in response to a request from the first node for an identity assignment, wherein each of the one or more unique first

node IDs is assigned by one or more entities other than the first node, and wherein each of the one or more unique first node IDs is associated with a first virtual private network (VPN);

receiving a packet from the first node, said packet including at least one unique first node ID and routing information for routing said packet to a destination address associated with said second node; and

routing the received packet to the destination address based on the received routing information and the received at least one unique first node ID and the destination address being associated with the first VPN.

13. (NEW) The method of claim 12, wherein the first node is a cable modem and the one or more unique first node IDs include a DOCSIS Service ID (SID) and an Internet Protocol (IP) address for the first node, wherein the request is a Dynamic Host Configuration Protocol (DHCP) request, wherein the IP address is assigned and sent in response to the DHCP request and based on a media access control (MAC) address of the first node as specified in the DHCP request.

14. (NEW) The method of claim 13, wherein the assigning and then sending of the IP address to the first node comprises:

forwarding the DHCP request from a cable modem termination system (CMTS) to a DHCP server;

receiving at the CMTS a DHCP response, including the IP address, from the DHCP server; and

sending the DHCP response, including the IP address, from the CMTS to the first node,

wherein the SID is assigned and sent by the CMTS during a ranging process between the first node and the CMTS.

15. (NEW) The method of claim 12, wherein the one or more unique first node IDs include an Internet Protocol (IP) address for the first node, wherein the request is a Dynamic Host Configuration Protocol (DHCP) request, wherein the IP address is assigned and sent in response to the DHCP request and based on a media access control (MAC) address of the first node as specified in the DHCP request.

16. (NEW) The method of claim 12, wherein the received packet is routed to the second node in a manner that does not cause the received packet to be routed through a VPN customer edge device.
17. (NEW) The method of claim 12, wherein the received packet is routed to the second node in a manner that does not cause the received packet to be routed outside an access network that includes the first and second nodes.
18. (NEW) The method of claim 12, wherein the one or more unique first node IDs include an ID of the first node that is specific to a network on which the first and second network nodes reside.
19. (NEW) The method of claim 12, wherein the one or more unique first node IDs include a DOCSIS Service ID for the first node.
20. (NEW) The method of claim 12, wherein the one or more unique first node IDs include a MAC address of the first node.
21. (NEW) The method of claim 12, wherein the one or more unique first node IDs include an IP address associated with the first node.
22. (NEW) The method of claim 12, wherein the first VPN uses a Multiprotocol Label Switching Protocol (MPLS).
23. (NEW) An apparatus for routing packets from a first network node to a second network node in a data network, comprising:
- one or more processors;
 - one or more memory, wherein at least one of the processors or memory are configured for:
 - assigning and then sending one or more unique first node identifiers (IDs) to the first node, wherein at least one of the one or more unique first node IDs is assigned and sent in response to a request from the first node for an identity assignment, wherein each of the one or more unique first node IDs is assigned by one or more entities other than the first node, and wherein each of the one or more unique first node IDs is associated with a first virtual private network (VPN);
 - receiving a packet from the first node, said packet including at least one unique first node ID and routing information for routing said packet to a destination address associated with said second node; and

routing the received packet to the destination address based on the received routing information and the received at least one unique first node ID and the destination address being associated with the first VPN.

24. (NEW) The apparatus of claim 23, wherein the first node is a cable modem and the one or more unique first node IDs include a DOCSIS Service ID (SID) and an Internet Protocol (IP) address for the first node, wherein the request is a Dynamic Host Configuration Protocol (DHCP) request, wherein the IP address is assigned and sent in response to the DHCP request and based on a media access control (MAC) address of the first node as specified in the DHCP request.

25. (NEW) The apparatus of claim 24, wherein the apparatus is in the form of a cable modem termination system (CMTS) and the assigning and then sending of the IP address to the first node comprises:

forwarding the DHCP request from the CMTS to a DHCP server;

receiving at the CMTS a DHCP response, including the IP address, from the DHCP server;
and

sending the DHCP response, including the IP address, from the CMTS to the first node,

wherein the SID is assigned and sent by the CMTS during a ranging process between the first node and the CMTS.

26. (NEW) The apparatus of claim 23, wherein the one or more unique first node IDs include an Internet Protocol (IP) address for the first node, wherein the request is a Dynamic Host Configuration Protocol (DHCP) request, wherein the IP address is assigned and sent in response to the DHCP request and based on a media access control (MAC) address of the first node as specified in the DHCP request.

27. (NEW) The apparatus of claim 23, wherein the received packet is routed to the second node in a manner that does not cause the received packet to be routed through a VPN customer edge device.

28. (NEW) The apparatus of claim 23, wherein the received packet is routed to the second node in a manner that does not cause the received packet to be routed outside an access network that includes the first and second nodes.

29. (NEW) The apparatus of claim 23, wherein the one or more unique first node IDs include an ID of the first node that is specific to a network on which the first and second network nodes reside.
30. (NEW) The apparatus of claim 23, wherein the one or more unique first node IDs include a DOCSIS Service ID for the first node.
31. (NEW) The apparatus of claim 23, wherein the one or more unique first node IDs include a MAC address of the first node.
32. (NEW) The apparatus of claim 23, wherein the one or more unique first node IDs include an IP address associated with the first node.
33. (NEW) The apparatus of claim 23, wherein the first VPN uses a Multiprotocol Label Switching Protocol (MPLS).